UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,063	03/31/2004	Dan T. Moore III	33850US1	7880

116 7590 04/10/2007

PEARNE & GORDON LLP
1801 EAST 9TH STREET
SUITE 1200
CLEVELAND, OH 44114-3108

EXAMINER	
NGUYEN, TU MINH	
ART UNIT	**PAPER NUMBER**
3748	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,063	MOORE ET AL.	
	Examiner	Art Unit	
	Tu M. Nguyen	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,13-17,20,21,27-29 and 32-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,13-17,20,21,27-29 and 32-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Amendment filed on January 8, 2007 has been entered. Claims 10-12, 18, 19, 22-26, 30, 31, and 35-37 have been canceled; and claims 1, 13-16, 20, 21, and 32 have been amended. Overall, claims 1-9, 13-17, 20, 21, 27-29, and 32-34 are pending in this application.

Claim Objections

2. Claim 15 is objected to because on line 2 of the claim, --with at least one of-- should be inserted following "balance"; and on line 3 of the claim, "and/or" should read --and--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-9, 13-16, 20, 21, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haselkorn et al. (U.S. Patent 6,161,379) in view of Foster et al. (U.S. Patent 6,732,432).

Re claims 1-2 and 32, as shown in Figures 1-4, Haselkorn et al. disclose an exhaust manifold (18) comprising:

- a slip cast ceramic inner layer (6) (see lines 7-8 of column 5) having an inner wall surface defining an exhaust gas passageway of the manifold,

- a ceramic insulation layer (10) disposed exterior to and adjacent the inner layer,

- an outer structural layer (16) disposed exterior to the insulation layer, and

- a strain isolation layer (12) disposed between the insulation layer (10) and the outer structural layer (16), wherein the strain isolation layer is a compliant layer effective to dampen unmatched thermal expansion between the outer structural layer and the insulation layer,

wherein the ceramic inner layer is made from a material (silicon nitride) that is highly resistant to thermal shock from thermal cycling of the manifold between ambient temperature and 500°C which is a typical temperature of an exhaust gas exiting a cylinder and entering the manifold, and

wherein the ceramic insulation layer comprising ceramic fibers (26) and ceramic filler material (28).

Haselkorn et al., however, fail to disclose the invention as cited above, however, fails to disclose that the strain isolation layer is an intumescent mat that expands on heating and is effective to dampen unmatched thermal expansion between the outer structural layer and the insulation layer.

As shown in Figure 1, Foster et al. disclose an exhaust emission control device (10). As illustrated in Figure 2, Foster et al. teach that it is conventional in the art to utilize a strain isolation layer (16) comprising an intumescent mat adjacent to a catalyst layer (14) so that the

isolation layer is adapted to hold the catalyst layer and to insulate it from shock and vibration (see lines 59-64 of column 2, 1-24 of column 3, and lines 17-53 of column 4), wherein the intumescent mat comprises an expandable material that expands on heating and contracts on cooling (see lines 1-11 of column 3) to dampen unmatched thermal expansion of any adjacent device or layer. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Foster et al. in the manifold of Haselkorn et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to reduce thermal stress on any adjacent device or layer.

Re claims 3 and 5, in the modified exhaust manifold of Haselkorn et al., the ceramic inner layer (6) comprises a major amount fused silica (see lines 56-58 of column 4).

Re claims 4 and 6, the exhaust manifold of Haselkorn et al. discloses the invention as cited above, however, fails to disclose that the ceramic inner layer (6) is slip cast from a slip composition comprising at least 60 weight percent colloidal fused silica particles and no more than 5 weight percent fibers.

Haselkorn et al. disclose the claimed invention except for specifying an optimum composition of the ceramic inner layer comprising at least 60 weight percent colloidal fused silica particles and no more than 5 weight percent fibers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum composition of the ceramic inner layer, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re claim 7, in the modified exhaust manifold of Haselkorn et al., the ceramic inner layer (6) is made from a ceramic material (silicon nitride) having a highly amorphous structure, able to withstand thermal cycling from 25°C up to 800°C and back down to 25°C without cracking (this thermal cycling temperature range is a typical range for an exhaust manifold to experience during an engine operation).

Re claim 8, the exhaust manifold of Haselkorn et al. discloses the invention as cited above, however, fails to disclose that the ceramic inner layer (6) is 0.05-5 mm thick.

Haselkorn et al. disclose the claimed invention except for specifying an optimum thickness range of the inner layer between 0.05 and 5 mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum range for the thickness of the inner layer, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re claim 9, in the modified exhaust manifold of Haselkorn et al., the outer structural layer (16) is made from aluminum (line 6 of column 5).

Re claims 13, 14, and 16, in the modified exhaust manifold of Haselkorn et al., as taught by Foster et al., the intumescent mat is contractible on cooling thereof after having been heat expanded; and the expandable material is in the form of embedded particles of vermiculite, perlite, or a combination thereof, dispersed throughout the intumescent mat.

Re claim 15, in the modified exhaust manifold of Haselkorn et al., the expandable material is vermiculate, perlite or a combination thereof (see lines 1-11 of column 3 in Foster et al.). Haselkorn et al., however, fail to disclose that the intumescent mat comprising, by weight,

20-60 percent ceramic fibers, 35-75 percent expandable material, balance with at least one of ceramic filler and binder material.

Haselkorn et al. disclose the claimed invention except for specifying an optimum composition range of the intumescent mat comprising, by weight, 20-60 percent ceramic fibers, 35-75 percent expandable material, balance with at least one of ceramic filler and binder material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum composition range of the intumescent mat, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re claims 20-21, the modified exhaust manifold of Haselkorn et al. discloses the invention as cited above, however, fails to disclose that the inner wall surface having a surface grain roughness less than 10 μm.

Haselkorn et al. disclose the claimed invention except for specifying an optimum value of a surface grain roughness less than 10 μm for the inner wall surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum value of surface grain roughness for the inner wall surface, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haselkorn et al. in view of Foster et al. as applied to claim 1 above, and further in view of Rudert et al. (U.S. Patent 4,205,527).

The modified exhaust manifold of Haselkorn et al. discloses the invention as cited above, however, fails to disclose that the manifold is water-cooled.

As shown in Figure 1, Rudert et al. disclose an exhaust manifold. Rudert et al. teach that it is conventional in the art to include water passage within a wall of the manifold to reduce a change in wall temperature of the manifold. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Rudert et al. in the modified manifold of Haselkorn et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to reduce stress and strain in a manifold wall due to thermal shock.

6. Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haselkorn et al. in view of Foster et al. as applied to claim 1 above, and further in view of Prigent et al. (U.S. Patent 5,386,696).

Re claims 27 and 29, the modified exhaust manifold of Haselkorn et al. discloses the invention as cited above, however, fails to disclose that the ceramic inner layer comprises a catalyst effective to convert at least a portion of CO and NOx in an exhaust gas flowing through the exhaust gas passageway to CO_2 and N_2 and O_2, respectively.

As shown in Figures 1-2, Prigent et al. teach an exhaust manifold with catalytic wall for internal combustion engine, comprising a catalyst support body (2) disposed within the exhaust gas passageway of the manifold, the catalyst support body having a catalyst material (4) disposed on a surface thereof in order to convert harmful emissions in the exhaust gas to compounds such as carbon dioxide, water, and nitrogen for release to the atmosphere. It would have been obvious to one having ordinary skill in the art at the time of the invention was made,

to have utilized the teaching by Prigent et al. in the modified manifold of Haselkorn et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to reduce or eliminate harmful emissions in an exhaust gas stream.

Re claim 28, as taught by Prigent et al., the catalyst material is selected from the group consisting of: a) palladium-containing catalyst materials; b) platinum-containing catalyst materials; c) perovskite catalysts having the form ABO_x where A is a rare earth element or an alkaline earth element, and B is a transition metal element; and d) fluorite catalysts having the form ABO_x where A is a rare earth element and B is Ce or Zr.

7. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prigent et al. (U.S. Patent 5,386,696) in view of applicant's admitted prior art.

Re claim 33, as shown in Figures 1-2, Prigent et al. disclose an exhaust manifold (10) comprising a ceramic inner layer (4) defining an exhaust gas passageway of the manifold (see lines 47-53 of column 3), the ceramic inner layer comprising a catalyst (line 66 of column 3 to line 2 of column 4).

Prigent et al., however, fail to specifically disclose that the catalyst is effective to convert at least a portion of CO and NOx in an exhaust gas flowing through the exhaust gas passageway to CO_2 and N_2 and O_2, respectively.

Since applicant fails to challenge the examiner's official notice that the noble metals utilized by Prigent et al. as a catalyst in the ceramic inner layer are effective to oxidize CO to CO_2 and reduce NOx in an exhaust gas stream to N_2 and water, it is therefore assumed that applicant has acquiesced with the examiner on such feature or limitation.

Re claim 34, the exhaust manifold of Prigent et al. further comprises a ceramic insulation layer (3) (see lines 42-46 of column 3) disposed exterior to and adjacent the inner layer, and an outer structural layer (1) disposed exterior to the insulation layer.

Response to Arguments

8. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

Re claims 1 and 32, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant argues that the examiner has not provided any motivation to combine Foster et al. with Haselkorn et al. (page 6 of Applicant's Amendment). The examiner respectfully disagrees with this argument.

As indicated on lines 1-11 of column 3, the strain isolation layer (16) in Foster et al. includes an intumescent mat comprising a vermiculite component that is adapted to expand or contract with changes in temperature to maintain firm, uniform or non-uniform compression. Because of this, the layer (16) is adapted to exert a retention force on a housing layer (12) when a catalyst temperature of the catalyst (14) is increased rapidly (see lines 17-53 of column 3). In this way, the housing layer (12) experiences lower thermal stress and is less susceptible to

damage due to a high operating temperature environment of the catalyst. Thus, by using the strain isolation layer (16) including an intumescent mat taught by Foster et al., Haselkorn et al. are able to reduce thermal stress on at least the outer structural layer (16) of their manifold.

Re claim 33, in response to applicant's argument that the layer (4) in Prigent et al. is not a ceramic inner layer (pages 8-9 of the Applicant's Amendment), the examiner again respectfully disagrees.

The layer (4) in Prigent et al. comprises a catalytic material deposited on a layer of an oxide or a mixture of oxides of large surface. These oxides are selected from simple or mixed oxides based on aluminum or zirconium (see lines 47-58 of column 3). Alumina or zirconia has been accepted as a ceramic material. Thus, Prigent et al. clearly disclose or teach the claim limitation in dispute.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tu M. Nguyen

TMN

April 2, 2007

Tu M. Nguyen
Primary Examiner
Art Unit 3748